



Purpose of the STEM Academic Standards Alignment with STARBASE Curriculum

STARBASE Wisconsin serves fifth grade youth attending public schools in the City of Milwaukee. Milwaukee Public Schools utilizes a variety of academic standard models to identify and explain the learning milestones in Science, Technology, Engineering, and Mathematics (STEM) Curriculum. As we explain to our students, "STARBASE is a science and math class."

This document is intended for upper elementary and middle school educators to accurately align and identify the standards taught in the STARBASE Curriculum. STARBASE is typically a 25 hour STEM program which is equivalent to 10 weeks of MPS STEM instruction.* Teachers are encouraged to use these charts to complete the extended learning experiences. STARBASE Wisconsin introduces and implements academic standards to students through three dimensional hands-on learning experiences which are experiments and in-class projects. We hope that you find this document to be a valuable resource as you assess and evaluate your students' progress.

Sources for Academic Standards

Common Core Standards: Mathematics - <http://www.corestandards.org/Math/>

Next Generation Science Standards - <http://www.nextgenscience.org/>

Wisconsin Technology and Engineering Standards - http://dpi.wi.gov/sites/default/files/imce/cte/pdf/te_standards.pdf

The strands for Wisconsin Engineering and Technology Education include:

- Architecture and Construction
- Engineering
- Leadership
- Manufacturing
- Transportation

* 30 minutes of science education is taught each day per district requirements. The time is an estimate. Time is gauged by Milwaukee Public School elementary school teachers.

Title of STEM Strand: <i>Physics and Chemistry - Motion and Force</i>				
Performance Expectation	Wisconsin Technology & Engineering Education Standards Connection		Instructional Resources	Formative Assessment(s)
Next Generation Science Standard				
Motion and Stability: Forces and Interaction MS-PS2-1	Elementary School <i>Architecture and Construction</i> AC1.e.5.e <i>Electronics</i> EL1.a.3.e. <i>Engineering</i> ENG2.a.1.e ENG2.b.1.e ENG2.b.2.e. ENG3.a.2.e ENG4.b.1.e ENG4.c.2.e ENG4.a.2.e ENG4.c.3.e ENG5.b.1.e <i>Manufacturing</i> MNF1.c.2.e MNF1.c.4.m	Middle School <i>Architecture and Construction</i> AC1.e.7.m <i>Engineering</i> ENG2.a.5.m ENG2.a.4.m ENG2.b.3.m ENG 4.b.3.m ENG4.c.5.m ENG4.a.4.m <i>Manufacturing</i> MNF1.b.3.m High School Engineering - ENG5.b.7.h, ENG5.b.8.h	<i>STARBASE Curriculum</i> E3.1.1.1. Physics - Newton's Three Laws of Motion: Introduction to Newton's First Law (Parent) A. Crash Test Dummies E3.1.1.4 Engineering: Engineering Design Process - Introduction to the Engineering Design Process (Parent) A. Eggbert	<i>STARBASE Flight Log:</i> -Inertia in Action Diagram - Eggbert Activity Assessment Students develop and test a restraint for Eggbert's seat.
				Summative Assessment(s)
				Post Test: It includes questions from all activities and lessons.

Middle School Science Standards: Matter and Its Interaction **MS-PS1-1**, Motion and Stability: Forces and Interaction **MS-PS2-1**, Engineering Design **MS-ETS1-1**

Vocabulary

Acceleration
Inertia
Potential Energy

Engineering Design Process
Kinetic Energy
Scientific Law

Force
Momentum
Simulation

Title of STEM Strand: <i>Physics and Chemistry - Motion and Force</i>			
Performance Expectation	Technology and Engineering Education Connection	Instructional Resources	Formative Assessment(s)
<p>Next Generation Science Standard</p> <p>Motion and Stability: Forces and Interaction MS-PS2-2</p> <p>Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.</p>	<p>Elementary School <i>Engineering</i> ENG2.b.1.e ENG2.b.2.e. ENG4.c.1.e</p> <p><i>Manufacturing</i> MNF1.a.3.e. x</p> <p><i>Architecture and Construction</i> AC1.b.4.e x</p> <p>Middle School <i>Engineering</i> ENG4.c.5.m ENG4.a.4.m ENG5.b.5.m</p> <p>High School <i>Engineering</i> ENG5.b.8.h</p>	<p><i>STARBASE Curriculum</i></p> <p>E3.1.1.1. Physics: A. Newton's Three Laws of Motion Introduction to Rocketry (Parent) <i>Straw Rockets</i> C. CO2 Rockets Dragsters</p> <p>Other sources: <i>Doctor Zoom's Straw Rocket Video</i> by Pitsco Education</p> <p>Impulse G3 Race System by Pitsco Education</p>	<p><i>STARBASE Flight Log:</i> -Straw Rocket Launch, Data Charts -CO2 Rocket Dragster Races, Data Charts</p> <p>Students launch and collect data from the CO2 Rocket Car and Straw Rocket tests.</p>
			<p>Summative Assessment(s) Post Test: It includes questions from all activities and lessons.</p>

	<i>Technology Engineering Broad-Based</i> BB1.c.3.m x BB1.c.3.m x		
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Middle School Next Generation Science Standards: Motion and Stability: Forces and Interaction MS-PS2-2

Vocabulary			
Acceleration	Axis of Rotation	Center of Gravity	
Center of Pressure	Force	Gravity	
Inertia	Mass	Momentum	
Thrust			

Title of STEM Strand: <i>Physics and Chemistry - Motion and Force</i>			
Performance Expectation	Additional Next Generation Science Standards:	Instructional Resources	Formative Assessment(s)
<p>Next Generation Science Standard</p> <p>Space Systems 5-PS2-1</p> <p>Support an argument that the gravitational force exerted by Earth on objects is directed down.</p>	<p>Middle School</p> <p><i>Motion and Stability Forces and Interaction: MS-PS2-1</i></p>	<p><i>STARBASE Curriculum</i></p> <p>E3.1.1.1. Physics - Newton's Three Laws of Motion: Introduction to Newton's First Law (Parent)</p> <p>A. Crash Test Dummies</p>	<p><i>STARBASE Flight Log:</i> -Inertia In Action Diagram</p>
			<p>Summative Assessment(s)</p>
			<p>Post Test: It includes questions from all activities and lessons.</p>

Vocabulary		
Engineering Design Process Scientific Law	Force Simulation	Inertia

Last updated on April 2019.



Title of STEM Strand: <i>Engineering</i> - Engineering Design Process				
Performance Expectation	Wisconsin Technology & Engineering Education Standards		Instructional Resources	Formative Assessment(s)
Next Generation Science Standard: Engineering Design 3-5-ETS1-1 Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.	Elementary School		<i>STARBASE Curriculum</i> E.3.1.1.4 Engineering: A.Engineering Design Process <i>Introduction to Engineering Design Process(EDP) (Parent)</i> <i>A.Eggbert</i> <i>B. Operation Bridge Quest</i> E3.1.1.5 Mathematics A. Number and Number Relationships <i>Figure That!</i>	<i>STARBASE Flight Log:</i> -Eggbert's Activity Assessment - Operation Bridge Quest: Engineering Design Process, Steps 2 - 4 -Figure That! Problem 1. and Problem 2. Students build and test a restraint for Eggbert's seat and a floating bridge to save Water's Edge.
	Architecture and Construction AC1.e.5.e x AC1.e.1.e AC1.a.2.e x AC1.g.2.e <i>Electronics Technology</i> EL1.a.3.e. <i>Eng. Broad Based</i> BB1.b.2.e BB1.f.2.e Engineering ENG1.a.1.e ENG1.a.2.e ENG1.a.3.e ENG1.a.4.e x ENG2.a.1.e x <i>Manufacturing</i> ENG2.b.1.e MNF1.c.2.e ENG2.b.2.e MNF1.c.4.m ENG3.a.1.e ENG3.a.2.e x ENG4.b.1.e x ENG4.c.2.e ENG4.a.2.e	Middle School <i>Architecture and Construction</i> AC1.e.7.m AC1.g.7.m <i>Engineering</i> ENG1.a.5.m x ENG1.a.6.m x ENG1.a.7.m x ENG1.a.8.m ENG2.a.5.m x ENG2.a.4.m ENG2.b.3.m ENG 4.b.3.m x ENG4.a.3.m ENG4.c.5.m ENG4.a.4.m <i>Manufacturing</i> MNF1.b.3.m MNF1.b.1.e		

	Engineering ENG4.c.3.e ENG5.a.3.e ENG5.b.1.e	Tech. and Eng. Broad-Based BB1.e.4.m x High School Engineering ENG5.b.7.h x, ENG5.b.8.h	Common Core Math Connection	Summative Assessment(s)
			Middle School Ratios & Proportional Relationships 6.RP.A.1 6.RP.A.3.C. 7.RP.A.2.D. 7.RP.A.2.	Post Test: It includes questions from all activities and lessons.

Middle School Science Standards: Matter and Its Interaction MS-PS1, Motion and Stability: Forces and Interaction MS-PS2-1, Engineering Design MS-ETS1-1 x, MS-ETS1-2

Vocabulary

Acceleration
Buoyancy
Engineer
Floating Bridge
Kinetic Energy
Potential Energy
Span

Arch Bridge
Clearance
Engineering Design Process
Force
Levee
Prototype

Beam Bridge
Criteria
Expansion Bridge
Inertia
Momentum
Roadbed

Title of STEM Strand: <i>Engineering</i> - Engineering Design Process				
Performance Expectation	Wisconsin Technology & Engineering Education Standards		Instructional Resources	Formative Assessment(s)
<p>Next Generation Science Standard</p> <p>Engineering Design 3-5-ETS1-2</p> <p>Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.</p>	Elementary School	Middle School	<i>STARBASE Curriculum</i>	<i>STARBASE Flight Log:</i> -Eggbert's Activity Assessment - Operation Bridge Quest: Engineering Design Process, Steps 2 - 4
	<p><i>Architecture and Construction</i></p> <p>AC1.e.5.e x</p> <p>AC1.e.1.e</p> <p>AC1.a.2.e</p> <p>AC1.g.2.e</p> <p><i>Electronics Technology</i></p> <p>EL1.a.3.e.</p> <p><i>Eng. Broad Based</i></p> <p>BB1.b.2.e</p> <p>BB1.f.2.e</p> <p><i>Engineering</i></p> <p>ENG1.a.1.e</p> <p>ENG1.a.2.e</p> <p>ENG1.a.3.e</p> <p>ENG1.a.4.e x</p> <p>ENG2.a.1.e x</p> <p>ENG2.b.1.e</p> <p>ENG2.b.2.e.</p> <p>ENG3.a.1.e.</p> <p>ENG3.a.2.e x</p> <p>ENG4.b.1.e x</p> <p>ENG4.c.2.e</p> <p>ENG4.a.2.e</p> <p>ENG4.c.3.e</p> <p>ENG5.b.1.e</p> <p><i>Manufacturing</i></p> <p>MNF1.c.2.e MNF1.c.4.m</p>	<p><i>Architecture and Construction</i></p> <p>AC1.e.7.m</p> <p>AC1.g.7.m</p> <p><i>Engineering</i></p> <p>ENG1.a.5.m x</p> <p>ENG1.a.6.m x</p> <p>ENG1.a.7.m x</p> <p>ENG2.a.5.m x</p> <p>ENG2.a.4.m</p> <p>ENG2.b.3.m</p> <p>ENG4.b.3.m x</p> <p>ENG4.c.5.m</p> <p>ENG4.a.4.m</p> <p><i>Manufacturing</i></p> <p>MNF1.b.3.m</p> <p>MNF1.b.1.e</p> <p><i>Technology and Engineering Broad-Based</i></p> <p>BB1.e.4.m</p> <p>High School</p> <p>Engineering</p> <p>ENG5.b.7.h x,</p> <p>ENG5.b.8.h</p>	<p>E.3.1.1.4 Engineering: A. Engineering Design Process</p> <p>Introduction to Engineering Design Process(EDP): Parent</p> <p>A.Eggbert</p> <p>B. Operation Bridge Quest .</p>	
				<p>Summative Assessment(s)</p> <p>Post Test: It includes questions from all activities and lessons.</p>

Middle School Science Standards: Matter and Its Interaction MS-PS1-1, Motion and Stability: Forces and Interaction MS-PS2-1, Engineering Design MS-ETS1-1 x, MS-ETS1-2

Vocabulary

Acceleration
Buoyancy
Engineer
Floating Bridge
Kinetic Energy
Potential Energy
Span

Arch Bridge
Clearance
Engineering Design Process
Force
Levee
Prototype

Beam Bridge
Criteria
Expansion Bridge
Inertia
Momentum
Roadbed

Title of STEM Strand: <i>Engineering - Engineering Design Process</i>			
Performance Expectation	Wisconsin Technology & Engineering Education Standards		Formative Assessment(s)
<p>Next Generation Science Standard</p> <p>Engineering Design 3-5-ETS1-3</p> <p>Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype can be improved.</p>	<p>Elementary School <i>Architecture and Construction</i> AC1.e.5.e x AC1.e.1.e AC1.a.2.e AC1.g.2.e</p> <p><i>Electronics</i> EL1.a.3.e.</p> <p><i>Engineering</i> ENG1.a.1.e ENG1.a.2.e ENG1.a.3.e ENG1.a. 4.e x</p> <p>ENG2.a.1.e x ENG2.b.1.e ENG2.b.2.e. ENG3.a.1.e. ENG3.a.2.e x ENG4.b.1.e x ENG4.c.2.e ENG4.a.2.e ENG4.c.3.e ENG5.b.1.e</p> <p><i>Technology</i> <i>Eng. Broad Based</i> BB1.b.2.e BB1.f.2.e</p> <p><i>Manufacturing</i> MNF1.c.2.e MNF1.c.4.m</p>	<p>Middle School <i>Architecture and Construction</i> AC1.e.7.m AC1.g.7.m</p> <p><i>Engineering</i> ENG1.a.5.m x ENG1.a.6.m x ENG1.a.7.m x ENG2.a.5.m x ENG2.a.4.m ENG 4.b.3.m x ENG4.c.5.m ENG4.a.4.m</p> <p><i>Manufacturing</i> MNF1.b.3.m MNF1.b.1.e</p> <p><i>Tech. and Eng. Broad-Based</i> BB1.e.4.m</p> <p>High School <i>Engineering</i> ENG5.b.7.h x, ENG5.b.8.h</p>	<p><i>STARBASE Curriculum</i></p> <p>E.3.1.1.4 Engineering: A. Engineering Design Process Introduction to Engineering Design Process(EDP): Parent</p> <p>A.Eggbert B. Operation Bridge Quest</p>
			<p><i>STARBASE Flight Log:</i> -Eggbert's Activity Assessment - Operation Bridge Quest: Engineering Design Process, Steps 2 - 4</p> <p>Students build and test a restraint for Eggbert's seat and a floating bridge to save Water's Edge.</p>
			<p>Summative Assessment(s)</p> <p>Post Test: It includes questions from all activities and lessons.</p>

Middle School Science Standards: Matter and Its Interaction **MS-PS1-1**, Motion and Stability: Forces and Interaction **MS-PS2-1**, Engineering Design **MS-ETS1-1** x, **MS-ETS1-**

Vocabulary

Acceleration
Buoyancy
Engineer
Floating Bridge
Kinetic Energy
Potential Energy
Span

Arch Bridge
Clearance
Engineering Design Process
Force
Levee
Prototype

Beam Bridge
Criteria
Expansion Bridge
Inertia
Momentum
Roadbed

Title of STEM Strand: Physics and Chemistry - Building Blocks of Matter			
Performance Expectation	Wisconsin Technology & Engineering Education Standards	Instructional Resources	Formative Assessment(s)
<p>Next Generation Science Standard</p> <p>Structure and Properties of Matter 5-PS1-1</p> <p>Develop a model to describe that matter is made of particles too small to be seen.</p>	<p><i>Tech. and Engineering Broad-based</i> BB1.d.1.e</p> <p><i>Electronics</i> EL1.a.5.m</p>	<p>STARBASE Curriculum</p> <p>E3.1.1.2 Chemistry: A.Building Blocks of Matter Creating & Building Molecular Models</p> <p>Molly Mod (Atomic Model Kits) - "Organic Student Set"</p>	<p>STARBASE Flight Log Molecular Models, "What's the Matter?" (Paragraph and Diagram)</p> <p>Students build molecular models with kits.</p>
	Next Generation Science Standards		Summative Assessment(s)
	<p>Middle School Matter and Its Interaction MS-PS1-1</p>		<p>Post Test: It includes questions from all activities and lessons.</p>

Vocabulary

Atoms
Elements
Nucleus
Single and Double Bonds

Compounds
Mass
Periodic Table of Elements
Weight

Electrons
Molecules
Protons

Title of STEM Strand: <i>Physics and Chemistry</i> - Building Blocks of Matter and <i>Mathematics</i> - Measurements				
Performance Expectation	Wisconsin Technology & Engineering Education Standards	Common Core Mathematics Connection	Instructional Resources	Formative Assessment(s)
<p>Next Generation Science Standard</p> <p>Structure and Properties of Matter 5-PS1-3</p> <p>Make observations and measurements to identify materials based on their properties.</p>	<p>Elementary School <i>Architecture and Construction</i> AC1.b.4.e</p> <p><i>Electronics</i> EL1.a.2.e</p> <p><i>Engineering</i> ENG5.a.3.e</p> <p><i>Technology and Engineering - Broad Based</i> BB1.b.2.e</p> <p>Middle School <i>Manufacturing</i> MNF1.a.6.m</p>	<p>Elementary School <i>Measurement & Data</i> 5.MD.A.1</p>	<p><i>STARBASE Curriculum</i></p> <p>E3.1.1.2 Chemistry: Physical and Chemical Changes Introduction to Physical and Chemical Changes: Parent</p> <p>E3.1.1.2 Chemistry: A. Building Blocks of Matter Chromatography</p> <p>E3.1.1.5 Mathematics B. Measurement Basic Measurement- Length, Liquid Volume, and Mass</p>	<p><i>STARBASE Flight Log:</i> -CSI Chromatography, Student Identification Chart -Physical and Chemical Changes, Photo Identification</p> <p>Students identify differences and similarities of 2 ice melting blocks.</p>
				Summative Assessment(s)
				Post Test: It includes questions from all activities and lessons.

Additional Elementary Next Generation Science Standards: Structure and Properties of Matter - 5-PS1-3, 5-PS1-4

Vocabulary

Absorbent
Capillary Action
Chromatography
Energy
Kinetic Energy
Medium
Physical Change
Polar Molecules
Solute
State of Matter

Adsorbent
Chemical Changes
Chromatogram
Gases
Law of Conservation of Energy
Molecule
Pigments
Potential Energy
Solubility
Temperature

Analytical Chemistry
Chemiluminescent Reaction
Cooling
Heating
Matter
Non-polar Molecules
Plasma
Solid
Solvent

Title of STEM Strand: <i>Physics and Chemistry</i> - Building Blocks of Matter			
Performance Expectation	Wisconsin Technology & Engineering Education Standards	Instructional Resources	Formative Assessment(s)
<p>Next Generation Science Standard</p> <p>Structure and Properties of Matter 5-PS1-4</p> <p>Conduct an investigation to determine whether the mixing of two or more substances results in new substances.</p>	<p>Elementary School <i>Technology and Engineering - Broad Based</i> BB1.b.2.e</p> <p>Electronics EL1.a.2.e</p>	<p><i>STARBASE Curriculum</i></p> <p>E3.1.1.2 Chemistry: Physical and Chemical Changes Introduction to Physical and Chemical Changes: Parent</p> <p>E3.1.1.2 Chemistry - Physical and Chemical Changes A.Warm Ups and Cool Downs</p>	<p><i>STARBASE Flight Log:</i> -Physical and Chemical Change, Photo Identification -Warm Up and Cool Down, Physical and Chemical Changes</p>
	Common Core Math Connection		Summative Assessment(s)
	<p>Elementary School <i>Geometry</i> 5.G.A.1 5.G.A.2</p> <p>Middle School <i>The Number System</i> 6.NS.C.6.C.</p>		<p>Post Test: It includes questions from all activities and lessons.</p>

Additional Elementary Next Generation Science Standards: Structure and Properties of Matter - 5-PS1-4
Middle School Next Generation Science Standards: Matter and Its Interaction - MS-PS1-2 and MS-PS1-4

Vocabulary

Celsius Temperature Scale
Control
Exothermic Reaction
Heat
Matter
Plasma
State of Matter

Chemical Changes
Cooling
Experimental Design
Kinetic Energy
Molecule
Polar Molecules
Temperature

Chemiluminescent Reaction
Endothermic Reaction Energy
Gases
Law of Conservation of Energy
Physical Change
Potential Energy

Title of STEM Strand: <i>Mathematics - Measurements and Physics and Chemistry</i>				
Performance Expectation	Next Generation Science Connection	Wisconsin Technology & Engineering Education Standards	Instructional Resources	Formative Assessment(s)
<p>Common Core Mathematics</p> <p>Numbers & Operation in Base Ten 5.NBT. A.2.</p> <p>Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.</p>	<p>Elementary School 5.ESS.2-1</p>	<p>Elementary School <i>Architecture and Construction</i> AC1.b.4.e</p> <p><i>Engineering</i> ENG5.a.3.e x</p> <p><i>Manufacturing</i> MNF1.a.3.e</p>	<p><i>STARBASE Curriculum</i></p> <p>E3.1.1.5 Mathematics B. Measurement Basic Measurement- Length, Liquid Volume, and Mass</p> <p>E3.1.1.2 Chemistry C. Atmospheric Properties Introduction to Atmospheric Properties (Parent)</p>	<p><i>STARBASE Flight Log:</i> -Basic Measurement: Metric System Notes - Figure That!, Problems 1 and 2 -Atmospheric Properties: Gases in the Atmosphere Students convert a percentage into a decimal equivalent by dividing with a power of 10.</p>
	<p>Common Core Mathematics Connection</p>			<p>Summative Assessment(s)</p>
	<p>Elementary School <i>Measurement & Data</i> 5.MD.A.1</p> <p>Middle School <i>Ratios & Proportional Relationships</i> 6.RP.A.3.C.</p>	<p>Middle School <i>Manufacturing</i> MNF1.a.6.m</p>		<p>Post Test: It includes questions from all activities and lessons.</p>

Vocabulary

Criteria	Cylinder	Decimal	Denominator
Digital Scale	Equivalent Fraction	Fraction	Graduated Cylinder
Grams	Liter	Meter	Meter Stick
Metric System	Numerator	Numerical Data	Percent
Quantify	Volume		

Title of STARBASE STEM Strand: <i>Technology - Applying Technology and Engineering - Computer Aid Design</i>			
Performance Expectation	Wisconsin Technology & Engineering Education Standards Connections	Instructional Resources	Formative Assessment(s)
<p>Wisconsin Technology & Engineering Standard:</p> <p>Engineering ENG 5.b.3.e.</p> <p>Discuss following steps-by-step directions to assemble a product.</p>	<p>Elementary School <i>Engineering</i> ENG5.a.1.e x x ENG5.b.3.e</p> <p><i>Technology and Engineering Broad Based</i> BB1.b.1.e</p> <p>Middle School <i>Engineering</i> ENG4.a.4.m ENG5.a.4.m x x ENG5.b.5.m</p>	<p><i>STARBASE Curriculum:</i></p> <p>E3.1.1.3 Technology: Innovation Introduction to Robotics: Parent B. Robotics Challenge LEGO(R) NXT Robotics Platform</p> <p>E3.1.1.4 Engineering: B. 3-D Computer Aided Design(CAD) DoD Mandatory PTC Modules - Creo Creo Parametric 3-D CAD</p>	Summative Assessment(s)
			<p>Students complete and test the mission-ready vehicle. Or, they can design and download their robots' program to navigate a course.</p> <p>The robot's ability to navigate the course is scored by a rubric.</p>
			<p>Post Test: It includes questions from all activities and lessons.</p>

Vocabulary

Assemble
Mission Ready Vehicle
Robot

Component
Programming Language
Robotics

Computer Aid Design
Ribbon
Robot Program

Tab
Working Directory

Title of STEM Strand: <i>Physics and Chemistry - Motion and Force and Mathematics - Data Analysis</i>				
Performance Expectation	Wisconsin Technology & Engineering Education Standards	Common Core Math Connection	Instructional Resources	Formative Assessment(s)
Next Generation Science Standard <i>Energy</i> MS-PS3-1 Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.	Elementary School <i>Architecture and Construction</i> AC1.b.4.e x <i>Manufacturing</i> MNF1.a.3.e. Middle School <i>Engineering</i> ENG5.b.5.m <i>Technology & Engineering Broad-Based</i> BB1.c.3.m High School 9-12 ENG5.b.8.h	Elementary School <i>Geometry</i> 5.G.A.1 5.G.A.2 Middle School <i>Ratios & Proportional Relationships</i> 6.RP.A.1 <i>The Number System</i> 6.NS.C.6.C	STARBASE Curriculum E3.1.1.1 Physics - A. Newton's 3 Laws of Motion 1. C. CO2 Rocket Dragsters E3.1.1.5 Mathematics - D. Data Analysis Straw Rocket Launch Other Sources: Doctor Zoom's Straw Rocket Video	Summative Assessment(s)
				STARBASE Flight Log: - Graph of Straw Rocket Launch, Data Analysis
				Post Test: It includes questions from all activities and lessons.
Middle School Next Generation Science Standards: <i>Energy - MS-PS3-1</i>				

Vocabulary

Acceleration
Center of Pressure
Inertia
Thrust

Axis of Rotation
Force
Mass

Center of Gravity
Gravity
Momentum

Title of STEM Strand: STEM Careers- STEM Careers on Military Facilities		
Performance Expectation	Instructional Resources	Formative Assessment(s)
<p>Wisconsin Technology & Engineering Education Standards</p> <p><i>Manufacturing</i> Elementary School MNF1.c.2.e and Middle School MNF1.c.4.m</p> <p>Recognize characteristics and benefits of teamwork, leadership, and citizenship in the school, community, and manufacturing settings.</p>	<p><i>STARBASE Curriculum</i> -STEM Careers on Military Facilities</p> <p>Other Sources: -Presentations from STEM Professionals</p> <p>-U.S. Bureau of Labor Statistics' Career Exploration, Online Resource</p> <p>-DoD STARBASE Video about <i>Careers on a Military Base</i></p> <p>-<i>Career Clusters Interest Survey</i> from the Oklahoma Department of Career and Technology Education</p> <p>-<i>The Career Book: Explorer</i> by Rick Trow Productions</p>	Summative Assessment(s)
		<p>The Career Book's online survey.</p> <p>Post Test: It includes questions from all activities and lessons.</p>

Title of STEM Strand: <i>Chemistry, Mathematics - Data Analysis and Technology - Applying Technology</i>			
Performance Expectation	Wisconsin Technology & Engineering Education Standards	Instructional Resources	Formative Assessment(s)
<p>Common Core Mathematics</p> <p><i>Geometry</i></p> <p>5.G.B.4</p> <p>Graph points on the coordinate plane to solve real-world and mathematical problems.</p>	<p>Elementary School <i>Architecture and Construction</i> AC1.b.4.e</p>	<p><i>STARBASE Curriculum</i></p> <p>E3.1.1.3 Technology B. Navigation and Mapping Introduction to Navigation and Mapping (Parent) B. Search and Rescue Mission</p> <p>E3.1.1.2 Chemistry B. Physical and Chemical Changes Introduction to Physical and Chemical Changes (Parent) A. Warm Ups and Cool Downs</p> <p>E3.1.1.5 Mathematics - D. Data Analysis Straw Rocket Launch</p> <p>Other Sources: -Doctor Zoom's <i>Straw Rocket</i> Video -"Washington D.C. Map" -CD and GEOINT visual maps prepared by the National Geospatial Intelligence Agency (NGA)</p>	<p><i>STARBASE Flight Log:</i> -Search and Rescue Mission on the Big Island of Hawai'i Mission 1 and 2 -Warm Up and Cool Down Activity, Endothermic and Exothermic Process -Data Analysis - Rocket Launch, Graphing Data</p> <p><i>Search and Rescue on the Big Island of Hawaii</i> Students read coordinates on a map to rescue a cyclist and determine the location of search and rescue vehicles.</p> <p><i>Warm Ups and Cool Downs and Straw Rocket Launch Data</i> Students graph the data (distance and temperature) collected in their experiments to determine the type of reaction or identify the fastest rocket.</p>

	Common Core Mathematics Connection		Summative Assessment(s)
	Elementary School <i>Geometry</i> 5.G.A.1 x x 5.G.A.2 x x Middle School <i>The Number System</i> 6.NS.C.6.C. x X <i>Ratios & Proportional Relationships</i> 6.RP.A.1		Post Test: It includes questions from all activities and lessons.

Next Generation Elementary Science Standards: *Structure and Properties of Matter* Grade 5 -5-PS1-4
Middle School Science Standards: *Energy* - MS-PS3-1

Vocabulary

Acceleration	Axis of Rotation	Cartography	Center of Gravity	
Center of Pressure	Compass Rose	Contour Interval	Contour Lines	Coordinates
Dependent Variable	Elevation	Equator	Evasion Chart(EVC)	Force
Geospatial Intelligence (GEOINT)	Gravity	Imagery Analysis	Independent Variable	Inertia
Latitude	Legend	Longitude	Map	Mass
Momentum	NGA	Navigation	Prime Meridian	Ratio
Satellite	Satellite Imagery	Scale Bar	Thrust	

Title of STEM Strand: <i>Mathematics</i> - Number and Number Relationships and <i>Engineering</i> - Engineering Design Process				
Performance Expectation	Wisconsin Technology & Engineering Education Standards		Instructional Resources	Formative Assessment(s)
Next Generation Science Standard <i>Engineering Design</i> MS-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.	Elementary School <i>Architecture and Construction</i> AC1.a.2.e x AC1.e.5.e AC1.e.1.e AC1.g.2.e <i>Engineering</i> ENG1.a.4.e ENG5.a.3.e <i>Technology and Engineering Broad-based</i> BB1.b.2.e BB1.f.2.e	Middle School <i>Architecture and Construction</i> AC1.g.7.m <i>Engineering</i> ENG1.a.5.m x ENG1.a.6.m x ENG1.a.7.m x ENG1.a.8.m ENG4.a.3.m <i>Technology and Engineering Broad-based</i> BB1.e.4.m x	<i>STARBASE Curriculum</i> E3.1.1.5 Mathematics A. Numbers and Number Relationships <i>Figure That!</i> E3.1.1.4 Engineering A. Engineering Design Process Introduction to the Engineering Design Process (Parent) <i>B. Operation Bridge Quest</i>	<i>STARBASE Flight Log:</i> -Figure That!, Chart for Problem 1 and 2. -Operation Bridge Quest, Steps 2 - 4
	Common Core Math Connection			
	Middle School <i>Ratios & Proportional Relationships</i> 6.RP.A.1 6.RP.A.3.C. 7.RP.A.2.D. 7.RP.A.2.			
				Summative Assessment(s) Post Test: It includes questions from all activities and lessons.

Middle School Next Generation Science Standards: MS-ETS1-1
High School Technology Education Standards: Engineering - ENG5.b.7.h

Vocabulary

Acceleration
Buoyancy
Engineer
Floating Bridge
Prototype

Arch Bridge
Clearance
Engineering Design Process
Force
Roadbed

Beam Bridge
Criteria
Expansion Bridge
Levee
Span

Key for the Activities and Lesson Plans

The names of lessons are color coded by the color highlighting the activity/lesson's name.

Engineering

E3.1.1.4 Engineering A. Introduction to Engineering Design Process(EDP): (Parent)
A.Eggbert B. Operation Bridge Quest

E 3.1.1.4 Engineering: B. 3-D Computer Aided Design (CAD) DoD Mandatory PTC Modules - Creo

Mathematics

E 3.1.1.5 Mathematics A. Numbers and Number Relationships Figure That!

E3.1.1.5 Mathematics B. Measurement Basic Measurement- Length, Liquid Volume, and Mass

E 3.1.1.5 Mathematics - D. Data Analysis Straw Rocket Launch

Technology

E 3.1.1.3 Technology B. Navigation and Mapping Introduction to Navigation and Mapping (Parent) B. Search and Rescue Mission

E 3.1.1.3 Technology: Innovation Introduction to Robotics: Parent and B. Robotics Challenge

Science

E3.1.1.2 Chemistry: A. Building Blocks of Matter Chromatography

E3.1.1.2 Chemistry: A. Building Blocks of Matter Creating & Building Molecular Models

E 3.1.1.2 Chemistry B. Physical and Chemical Changes Introduction to Physical and Chemical Changes (Parent)
A. Warm Ups and Cool Downs

E3.1.1.2 Chemistry C. Atmospheric Properties Introduction to Atmospheric Properties (Parent)

E3.1.1.2 Chemistry: Physical and Chemical Changes Introduction to Physical and Chemical Changes: Parent

E3.1.1.2 Chemistry - Physical and Chemical Changes A.Warm Ups and Cool Downs

E 3.1.1.1 Physics - A. Newton's 3 Laws of Motion 1. C. CO2 Rocket Dragsters

E3.1.1.1. Physics - Newton's Three Laws of Motion: Introduction to Newton's First Law (Parent)
A. Crash Test Dummies